REMARKS

Claims 5, 6, 28-34 are pending in the application.

Request for information

Examiner requested information in regard to DE 39 27 230 to *Englert*.

The jointing device disclosed in DE 39 27 230 has been developed and built as a prototype for experimental and testing purposes. This experimental apparatus as disclosed in the German patent application had three jointing stones. This jointing device was purely experimental and has never been used in production. According to Mr. Englert, the jointing stones 13 of this device had a diameter of approximately 10 mm. The stroke length was approximately 80 mm.

A relevant text portion of *DE 39 27 230* in regard to the movement of the jointing stones can be found in col. 2, lines 26ff. This text portion reads as follows (the undersigned who is fluent in both the English and German languages has prepared the translation and states that the English translation is accurate).

"The support 12 with the jointing stones 13 can be moved by a drive 23 along the sliding guide 11. A piston-cylinder unit is provided as a drive in the illustrated embodiment; its cylinder 24 is attached to the base member and its piston rod 25 extends parallel to the sliding guide 11 and with its free end is attached to a projection 26 of the support 12. In Fig. 1, the support 12 is shown in its right end position in which the piston rod 25 is retracted. By extending the piston rod 25, the support 12 with the jointing stones 13 can be moved along the sliding guide 11. Such an axial movement is carried out when by means of the jointing stones 13 a straight jointing process is to be performed. In this connection, the jointing stones 13 are moved across the cutting edges to be jointed."

Fig. 1 illustrates the right end position of the support 12 and therefore also allows to determine the left end position of the support and the stroke length of the jointing stones from one end position to the other end position. Therefore, it is clear that the stroke length is multiple times greater than the width of the individual jointing stones 13. As mentioned above, the usual jointing stone width is 10 mm and the stroke length is 80 mm, as verified by the inventor Mr. Englert.

For jointing, the outer jointing stones must be moved past the ends of the cutting

edge to be jointed. When radially advancing the jointing stones, two jointing stones were thus located in the area of the cutting edge of the cutting blade while one of the outer jointing stones, depending on which axial end position had been selected for advancing, was outside of the cutting edge area. Primarily because of this configuration, significant problems with regard to the quality of the jointing process resulting e.g. from different wear of the three jointing stones and the generation of stepped and partially conically tapering cutting edges were observed. In particular, as a result of the large stroke, the relatively small jointing stones wore off relatively quickly.

When using only a single jointing stone as known in the prior art (e.g. *Mann - US 2,864,219),* the jointing stone also moves axially past the edge. The radial adjustment of the jointing stone is done either after each back-and-forth stroke or after each stroke in the axial end position. This is in contrast to the present invention where an oscillating movement - several strokes back and forth - is performed. Advancing the jointing stone against the cutting edge in this case (without the jointing stone being outside the cutting edge area) is disadvantageous in regard to the wear of the jointing stone.

As apparent from *DE 39 27 230* and *Mann (US 2,865,219)* the jointing stone width is always much smaller than the stroke length across the cutting edge: in *DE 39 27 230* the stroke length to stone width has a ratio of 8:1; in *Mann* the cutting edge length is 2.8 cm *(measured in Fig. 1)* and the width of the holder 19 *(measured in Fig 1)* is about 0.4 cm so that at least a ratio of 2.8/0.4 = 7:1 results, as the stroke must be as long as the cutting edge.

DE 39 27 230 does not show the cutting edge positioned relative to the jointing stones; but it is obvious to any person skilled in the art that jointing must be performed across the entire length of the cutting edge (as illustrated by *Mann*) because otherwise the cutting edges would not be straight and uniform.

Claim Objection

Claims 5 and 16 are objected to because there is a method step included in the preamble that should be placed into the body of the claim. Claim 5 has been amended accordingly. Claim 16 is canceled.

Claim Rejections - 35 U.S.C. 112

Claims 2, 4-7, and 16-31 stand rejected under 35 U.S.C. 112, 2nd paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of the term jointing is not clear in examiner's opinion. The term "during jointing" has been removed to avoid confusion.

Based on examiner's remarks, it appears examiner is not familiar with "jointing". Jointing is a term of the art in wood working machines and is well-known worldwide. The process of jointing, as understood in the art, refers to generating a uniform cutting circle of all cutting edges on a tool. The process is carried out such the tool in its working position rotates at operating speed and the cutting edges are machined by engaging the jointing stones to the required same radius or diameter. See also the explanation in *Theien (US 4,581,856)* in col. 8, lines 5-11; col. 9, lines 7-8.

Since jointing is carried out as the tool rotates in its working position, all imprecisions such as spindle imbalance, clamping deviations of the cutters, and possibly present tool imbalance are eliminated by this process. In principle, a grinding process is carried out, but the technical term for **equalizing** the cutting circle is **jointing**.

Attached please find two brochures published by the assignee, Weinig AG, that concern inter alia the process of jointing. Moreover, assignee submits a computer animation which illustrates the jointing process in detail.

On sheet 10 of the brochure "HighSpeed Series " there are illustrations of jointing elements as well as a brief description of the jointing process. The description above the illustrations makes clear that all cutting edges of a cutter head must be positioned on the same cutting circle in order to provide optimal surface quality of the machined product. In order to have the cutting edges of all knives positioned on the same cutting circle, the jointing system as illustrated is used. The upper illustration on sheet 10 shows a jointing stone which is just about to engage a cutting edge of a long knife. In order for the cutting edge of this knife to be jointed across the entire length, obviously a very long stroke in the axial direction is necessary.

In the illustration underneath a profiled jointing stone is shown with which a profiled cutting edge is to be jointed. The profiled cutting edge projects radially past the cutter head. In such a profiled cutting edge configuration, the method of axially moving the jointing stone is of course impossible.

In the brochure "All about Tools" on pages 16/17, the basic problems in regard to a cutter head with several knives and the solution provided by the jointing process are described briefly. The central illustration of page 17 shows a straight cutting edge of a knife and a narrow jointing stone engaging the cutting edge of the knife on the cutter head.

The process of jointing is also explained especially well in the Computer Animation that will be submitted by e-mail to the examiner.

Since jointing is a technical term that is used and understood by a person skilled in the art, there is no reason to eliminate this term or change this term in the claims. Any other term would just cause confusion.

In summarizing the above, the jointing process provides that the cutting edges on a tool are caused to be positioned on the same cutting circle as a result of the action of the jointing stones on the cutting edges as the tool is rotated and the jointing stones engage and machine the cutting edges.

Rejection under 35 U.S.C. 103

Claims 16-19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Sloan (US 1,531,350).*

Claims 2, 4-7, and 16-31 stand rejected under 35 USC 103(a) as being unpatentable over *Mann (US 2,864,210).*

Claims 2, 4-7, 16-31 stand rejected under 35 USC 103(a) as being unpatentable over *Theien (US 4,581,856)* and *Fosterling (US 1,114,743)* in view of *Englert, Mann* and *AAPA* .

Claims 2, 4, 7, 16 to 27 have been canceled; the above rejections therefore apply only to claims 5, 6, 28 to 31. New claims 32 to 34 have been added. The claims define the present invention in accordance with the following features:

(a) the jointing stone oscillates and several relative strokes are performed (claims 28, 32, 33);

(b) the stroke length is smaller than the length of the jointing stone (claims 33, 34);

(c) the stroke length is smaller/multiple times smaller than the cutting edge (claims 5, 28).

Sloan discloses that saw teeth of a circular sawblade 15 are to be sharpened by means of a file 27. This sharpening of saw teeth has nothing in common with jointing knives of a cutter head of the wood processing machine. Assignee is perplexed that such reference would even be cited against a jointing method because the disclosed process and apparatus have nothing in common with the claimed invention.

The present invention relates to a cutter head provided with knives that are clamped in recesses on the cutter head about the circumference. The knives project radially past the cutter head and have projecting cutting edges. When such a cutter head machines pieces of wood, the cutter head is rotated at high speed. When the cutting edges are not aligned with one another (are not on the same cutting circle) and are not smooth, the processed surface of the workpiece will be uneven, may show ridges or grooves and, as a whole, is of low quality.

In order to ensure a high surface quality, the cutter head is jointed. When jointing a cutter head with knives, the jointing stones engage, as shown in the attached brochures "HighSpeed Series" and "All about Tools" of the assignee, the cutting edges of the cutter head as the cutter head rotates. The task of the jointing stones is to reduce the cutting edges of the cutting blade of the cutter head to such a common cutting circle. For this reason, the cutter head during jointing rotates about its axis at operating speeds so that the cutting edges of the knives are jointed by the jointing stone. See also Computer Animation.

Such a method is not used in the sharpening process according to *Sloan*. It is it not even possible to carry out such a process with the device of *Sloan*. When sharpening saw teeth, each individual sawtooth must be sharpened by means of the file 27. For this purpose, the file 27 engages the space between neighboring saw teeth, as shown in Fig. 2 of *Sloan*. The file 27 is moved back and forth by means of carriage 20, 21 within the gullet between the teeth and cuts the saw tooth at the desired pitch and removes the necessary amount of metal from the saw tooth to sharpen the tooth (see page 2, left column, lines 51-57). The file 27 can be tilted or canted to create the desired pitch angle (page 2, left column, lines 20-24). After the file 27 is retracted, the circular sawblade 15 is rotated by one tooth and the file is then inserted into the next gullet between saw teeth so that the next saw tooth can be sharpened (see page 2, left column, lines 57-62: " ... so that

each and every tooth may be sharpened without further adjustment of parts").

The file 27 is not advanced radially while the saw blade is rotating and the file 27 does not act on all the sawteeth of the rotating sawblade. There is also no indication that the stroke length is shorter than the length of the cutting edge (given the narrow configuration of sawteeth, it would be highly unlikely that the operator could even perform an effective removal by using a stroke shorter that the width of the saw tooth).

The secondary reference *US 2,574,499 (Ruscittii)* shows only the possibility of sharpening saw teeth of a circular sawblade 38 by means of a grinding wheel 40. The only difference to *Sloan* is that no file but a grinding wheel is used for sharpening. This cited references also has nothing in common with a jointing process in accordance with the present intention.

In the sharpening processes according to the *Sloan* and *U.S. 2,574,499* the sharpening means 27, 40 are radially advanced into the circular sawblade 15, 38 until the sharpening means penetrate the cutting circle. In the sharpening position, the circle of all saw teeth at the periphery of the circular sawblade 15, 38 is thus greater than the diameter where the actual sharpening operation is carried out and where the sharpening means 27, 40 engage the sawteeth to be sharpened.

In the method according to the invention the jointing stone 25 during the jointing process does not penetrate the cutting circle of the cutting edges 9 of the knives 3 of the tool. The material removal during jointing is performed at the circumference in the tangential direction.

Based on the completely different process for sharpening saw teeth on a circular sawblade it is certainly not obvious to employ such a method for jointing cutting edges of cutting blades of a rotating tool. The two cited references provide information only in regard to how individual saw teeth are to be sharpened. If this teaching were applied to a tool for woodworking, a jointing stone would have to machine each cutting blade individually while the tool is standing still. This has nothing in common with the method according to the invention.

Moreover, it is respectfully submitted that by means of the circular sawblade workpieces are to be sawed. The knives 3 of the tool 1 according to the invention however are used for planing or profiling workpieces. For planing workpieces, the straight knives

3 are used while for profiling correspondingly profiled knives are used. When cutting or sawing a workpiece, the surface quality of the sawed workpiece is not important. In contrast to this, wood that is to be planed or to be molded should have after planing or after the profiling step a high-quality smooth machined surface. For this purpose, is it is necessary that the cutting edges of the employed knives are all positioned on the same cutting circle. In this way, it is ensured that the required high surface quality of the workpiece is obtained.

The problems faced in woodworking and in proper jointing have been discussed in detail in the present application. In view of the discussed problems and requirements, it is apparent that sawing and surface machining are completely different technologies which require completely different features. This means that in the case of saws and the related sawing process it is of no consequence whatsoever that all saw teeth have the same cutting circle. For this reason, the saw teeth of the circular sawblade according to *Sloan* and *U.S. 2,574,499* are sharpened individually because it is only important that the individual saw teeth are sharp not that they are all precisely on the same cutting circle.

In the case of knives for surface processing in woodworking, it is however of greatest importance that the cutting edges of the knives are positioned on the same cutting circle in order to ensure that the machined workpieces have high surface quality. For this reason, the sharpening process is done completely differently than in the case of a circular sawblade. The cutting edges of the knives of the tool must be jointed by the jointing stone 25 so that the cutting edges 9 of all knives 3 are positioned on the same cutting circle.

In view of these entirely different principles, it is not obvious for a person skilled in the art of jointing to look at a technical field where the above mentioned basic requirements are not met. Moreover, as pointed out above, there are numerous technical differences between the cited references and the invention as claimed. The independent claims 5, 28, 32, 33, 34 are therefore not anticipated or obvious in view of *Sloan.*

U.S. 2,864,210 (Mann) shows a method in which by means of a jointing stone 22 the cutting edges of knives of a cutter head are jointed. As shown in Figs. 1 to 8 of this reference, the cutting edge of the knives 3 is several times longer than the width of the jointing stone. Accordingly, the jointing stone 22 must carry out a very large stroke in order

to joint the cutting edge of the knives 3 across the entire length. This reference corresponds basically to the prior art discussed in the present application in connection with Fig. 6.

The cited reference dates from the year 1958 and shows that for jointing of a long cutting blade a single jointing stone 22 is to be used. The German patent application 39 27 230 to *Englert*, dating from 1989, still employs short jointing stones 13 for jointing a long cutting edge. Within the time period of almost 30 years, those skilled in the art never deviated from the concept of using a jointing device performing a stroke across the cutting edge in connection with a short jointing stone - a long jointing stone has never been used in connection with axial movement across the cutting edge (after all, a long jointing stone longer than the cutting edge covers the entire cutting edge and there is no need for axial movement - which would only complicate the set-up of the jointing machine).

It is therefore not at all obvious to utilize, based on the disclosure of *Mann,* substantially longer jointing stones and to employ a short stroke during the jointing process or to even perform several very short strokes in an oscillating fashion with the long jointing stone.

Mann does not disclose or suggest that the stroke length is smaller than the length of the jointing stone (claims 33, 34); *Mann* also does not disclose or suggest that the stroke length is smaller/multiple times smaller than the cutting edge (claims 5, 28).

U.S. 4,581,856 (Theien) is based on an entirely different principle than the aforementioned references. This reference proposes during straight jointing, i.e., jointing of a straight cutting edge, to position the jointing stone 140 axially stationarily. In *Theien,* the technology usually employed for profile jointing is allied to jointing straight cutting edges. Therefore, the basic principle of this reference is an entirely different one than that of the present invention. In the method according to *Theien* the jointing stone, independent of whether it is profiled or straight, is secured stationarily when the jointing process is performed.

When objectively looking at this reference, nobody can derive a suggestion to employ the straight jointing stone of *Theien* covering the entire length of the cutting edge and to axially move the jointing stone because the cited reference expressly uses

stationary jointing stones in order to avoid the disadvantages that are discussed in this reference; in column 3, lines 25 to 38, of *Theien* a method is disclosed that corresponds to *Englert* or *Mann*: narrow jointing stones are used that during the jointing process perform a stroke in the axial direction of the tool. *Theien* discusses in detail that this type of jointing is disadvantageous and that the discussed disadvantages are to be overcome by the stationary jointing stones.

Consequently, the cited reference *Theien* proposes to no longer perform an axial stroke and instead to design a jointing device such that the straight edges of the cutting blade can be jointed without employing an axial stroke by a jointing stone having an appropriate length.

The cited reference thus cannot provide a person skilled in the art with a suggestion to axially move the jointing stone; after all, the reference teaches clearly that a long jointing stone is to be used that is stationary and performs no stroke in order to overcome the disadvantages associated with axial movement of jointing stones. The examiner arrives at the conclusion of obviousness of combining a long jointing stone and axial movement clearly only in hindsight and knowledge of the present invention.

Fosterling (US 1,114,743) teaches jointing with a jointing stone having a length that matches the length of the cutting edge to be jointed. It does not disclose anymore than *Theien.*

In examiner's view it is obvious to combine such a long stone (covering the entire length of the cutting edge) with an axial movement as in *Englert*, *Mann or AAPA (Fig. 6 of the present invention).*

There is no incentive to do so as the axial movement of short jointing stone is a must in order to cover the entire length of the cutting edges on the rotating tool; it should be kept in mind that the jointing interaction of cutting edges and jointing stone is realized by the **rotation** of the cutter head - the movement of the jointing stone in the axial direction is only necessary in order to cover the entire length of the cutting edges and has nothing to do with extra sharpening. When the jointing stone is so long that it extends across the entire length of the cutting edges, this axial movement is obsolete!

The examiner argues that while it is true that the references teach either a long stone **OR** axial reciprocation, one must look at the art as a whole to see whether or not it

is obvious to have both long stones and axial reciprocation. As stated by the examiner "Both are desirable features (as espoused by the respective references), so why not use both?" Examiner's answer is that it costs more and takes more time, not because it's non-obvious.

Examiner's answer is not persuasive. The axial movement devices are known and well established. No additional costs would be required to develop or design or make such devices except adapting the holder to accommodate the longer jointing stone. The time it takes for a short jointing stone to carry out a long stroke across the entire cutting edge is longer than it would take a long stone to move only a short stroke (much shorter than the length of the cutting edge) across the cutting edge. Therefore, no extra costs would be incurred and time would be saved.

It is clearly a long standing prejudice in the art and adherence to traditional practice in the art that has prevented a person skilled in the art to ever attempt to combine the two contrary concepts. There was no need to do so because a long jointing stone inherently achieves what a short stone must work at by carrying out axial movement (coverage of the entire cutting edge length).

The inventive method for the first time has overcome a longstanding prejudice in the art in that it combines two contrary concepts for which there is no reason to combine them as they achieve the same thing by two different approaches. The prior art methods that employ short jointing stones use a single stroke across the cutting edge or a single back and forth movement and thereafter the jointing stone is advanced again in the radial direction. In contrast to this, the present invention employs an oscillating movement, i.e, the jointing stone is moved several times across the cutting edge and provides an excellent smoothing action. The inventive method has moreover the advantage that the jointing stone can be made from a soft material which has the advantage that the jointing stone can optimally smooth the cutting edges of the cutting blade. Based on the length and the large surface area in engagement, the jointing stone still has a long service life. In contrast to this, the use of short jointing stones requires the use of very hard materials in order to achieve a satisfactory service life. The method according to the invention thus also has an effect on the material of the jointing stone. With soft jointing stone material, the cutting edges of the jointing stone can be smoothed excellently. In this connection, the

disadvantage of jointing with the stationary jointing stone 140 of *Theien* where nicks or notches within the jointing stone are directly transmitted onto the cutting edge of the cutting blade and cause marks on the cutting edge is overcome also.

Applicant therefore has overcome a longstanding prejudice and combined two methods that were thought to be incompatible. Applicant's invention as claimed in independent claims 5, 28, 23, 33, and 34 is therefore not obvious.

CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned would appreciate a phone call or **e-mail** from the examiner to discuss appropriate amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent and Trademark Office deposit account 50-1199.

Respectfully submitted on August 7, 2007,

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GEH

Encl.: - Brochure "All about Tools", Weinig AG
- Brochure "High Speed Series", Weinig AG
- Computer Animation of Jointing Process (to be sent to examiner by e-mail)
- EP 0 358 059 B1